

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/04300

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC(7) : H04M 11/04; H04B 10/00, 10/12, 11/00  
US CL : 340/310.01, 310.02, 310.03, 310.04, 310.05, 310.06, 310.07, 310.08; 379/56.2; 359/171, 173; 333/152, 154  
According to International Patent Classification (IPC) or to both national classification and IPC

**P. FIELDS SEARCHED**  
Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 340/310.01, 310.02, 310.03, 310.04, 310.05, 310.06, 310.07, 310.08; 379/56.2; 359/171, 173; 333/152, 154

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## **C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category * | Citation of document, with indication, where appropriate, of the relevant passages                      | Relevant to claim No.   |
|------------|---|---|
| X<br>Y     | US 3,656,112 A (PAULL) 11 April 1972 (11.04.1972), Fig. 2 and corresponding disclosure.                 | 1-11, 16-18, 21-25, 29, 37, 40, 44-49, 51 & 57                  |
| Y          | US 5,664,002 A (SKINNER, SR.) 02 September 1997 (02.09.1997), Figs. 2-4 and corresponding disclosure.   | 12-15, 19-20, 26-28, 30-36, 38-39, 41-43, 50 & 52-26<br>26 & 50 |
| Y          | US 5,777,769 A (COUTINHO) 07 July 1998 (07.07.1998), Fig. 1 and corresponding disclosure.               | 12-15, 34-35, 41-43 & 55-56                                     |
| Y          | US 3,445,814 A (SPALTI) 20 May 1969 (20.05.1969), Fig. 2 and corresponding disclosure.                  | 19, 32, 38-39 & 52  |
| Y          | WO 95/29536 A1 (NORWEB PLC) 02 November 1995 (02.11.95), Figs. 11a-b & 13 and corresponding disclosure. | 20, 27-28, 30-31, 36 & 53                                       |
| Y          | US 4,142,178 A (WHYTE et al.) 27 February 1979 (27.02.1979), Fig. 3 and corresponding disclosure.       | 33 & 54   |
| A          | US 5,864,284 A (SANDERSON) 26 January 1999 (26.01.1999), Figs. 3-4 and corresponding disclosure.        | 1-57  |

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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| Special categories of cited documents:  |  |
| * "A" document defining the general state of the art which is not considered to be of particular relevance  | * "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  |
| * "E" earlier application or patent published on or after the international filing date   | * "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone   |
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| * "P" document published prior to the international filing date but later than the priority date claimed  |  |

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| Date of the actual completion of the international search<br>03 July 2002 (03.07.2002)   | Date of mailing of the international search report<br>07 AUG 2002     |
| Name and mailing address of the ISA/US<br>Commissioner of Patents and Trademarks<br>Box PCT<br>Washington, D.C. 20231<br>Facsimile No. (703)305-3230 | Authorized officer<br>Benjamin C. Lee<br>Telephone No. (703) 305-8576 |